

DRAGON USER

International edition

The independent Dragon magazine

95p US\$3.25 November 1985

*Blaze away with
Clay Shoot!*

Dragon Bingo

*Coates on
graphics*

*WIN Design Design's
Dark Star!*

DRAGON USER



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How to submit articles

The quality of the material we can publish in
Dragon User each month will, to a very great
extent depend on the quality of the
discoveries that you can make with your
Dragon. The Dragon computer was launched
on to the market with a powerful version of
Basic, but with very poor documentation.

Articles which are submitted to Dragon
User for publication should not be more than
2000 words long. All submissions should be
typed. Please leave wide margins and a
double space between each line. Programs
should, wherever possible, be computer
printed on plain white paper and be 100%
correct by a tape of the program.

We cannot guarantee to return every
submitted article to program, or please keep a
copy. If you want to have your program
returned you must include a stamped,
addressed envelope.

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Byteage, how to be Harvey Smith, and 6809
CR

Clayshoot!

Steve Gathorpe can write a mean game
— his latest lets you test your marksmanship
without endangering life, limb or
property!

Graphics

Roy Coates, the man who created the
Dragon version of Software Project's Man-
ic Miner, lets out a few trade secrets in how
to get great graphics on your micro

Dragon Bingo

Pam O'Leary wrote this program to keep the
lids quiet so she could get on with writing
programs — a basic listing which turns
your Dragon into a Bingo caller with a
perfect memory

Editorial

A YEAR ago, very few pundits in the computer industry would have
given the Dragon more than a couple of months to live — but here we
are, November 1985, and still kicking.

If you want evidence of that, then the place to go is the Third 6809
Show, which will be held at the end of this month. While the company
which was originally organising it has gone into receivership, the Show
has survived — another indication of the Dragon's resilience?

Some software and hardware houses may be missing from the
line-up of exhibitors, but there will still be enough to fill the halls.

There should be plenty of new pieces of hardware, new games and
utilities, new peripherals — even, if certain promises are kept, new
Dragons.

But, to be honest, it doesn't matter how many new bits and pieces are
on display if the most important element isn't there — and that's you.

Computers don't survive just because companies carry on making
things for them, although that is a major factor.

The real reason the Dragon has survived 1985 — and will continue on
into 1986 — is the continued loyalty and support of ordinary Dragon
owners.

There are, however, indications that further problems may lie ahead.
Certain companies are now selling their products by mail order only,
largely because the high street retailers and major distributors won't
touch the Dragon.

This only makes the 6809 Show even more valuable. See you there.

5 Dragon Plus

The Plus cartridge from Andtek Data De-
sign has a great deal to offer the discern-
ing Dragon owner — says Roy Coates

Dragonsoft

Pages and pages of reviews for your micro
— the latest games and utilities given the
Dragon User test by our panel of experts

Adventure Trail

Mike Garsied with a page and a half of
hints, tips and reviews for the dedicated
Dragon adventurer — this month he looks
at Computer's version of the first ever
adventure, and Scott Adams' first title,
inspired by the same game: Croswater and
Wood's Advent

Dragon Answers

Brian Cadge with another month's worth
from his bulging mail-bag: if you have a
Dragon problem, why don't you drop him a
line?

Firmware

Benevolent Brian again with the third in his
series on the Dragon's ROM for you to cut
out and keep

Competition Corner

Gordon Lee sets another mind-boggling
puzzle — this month Design Design pro-
vide the prizes: 20 copies of Dark Star.
First new space strategy game

MOVE OVER POLE POSITION HERES -

SPEED RACER



Dragon Colour Disk

Take your choice of 4 circuits then race from the cockpit of a Formula 1 Car

One of the best games I've seen for ages - Dragon User



Dragon Colour Disk

Available for
Dragon 32/64 cassette £8.00
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Premier DOS disk £9.95
Tandy colour 32K cassette £8.00
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Tandy version available at **TANDY** Shops
other versions available on
our 24 hour service

By phone: **0726 68020**

By post to: **HI TECH**
41 Truro Rd. St Austell,
Cornwall PL25 5JE



MICRODEAL

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 12-13 Little Newport Street, London WC2H 1PP.

6809 Show Blues

I AM writing to you asking for some information on the 6809 Show. I wrote away for tickets five weeks ago and I have not had anything back at all.

Christopher Leach
3 Mirror Walk
Horsforth
Darrington
Co Durham DL2 2AR

COMPUTER Marketplace, the company originally organising the 6809 Show, has gone into liquidation — but the Show will be going ahead, however see news, page 7.

Exception

I AM writing regarding the 'Coding the Word' article by Peter Whittaker in September issue of Dragon User.

I feel strongly about the program published being offered to readers on cassette for £3 when the designer receives £6 for publication. £12 if it is a program of the month, and also when £15 computer cassettes only cost 50p in the shops.

Craig Henderson
39 Woodbury Avenue
Wells
Somerset

PETER WHITTAKER revealed rather more than £10 for this article — it was not in the Open File section. As to his charging for copies of the program on cassette, if you type in the listing yourself then you only pay the cover price of the magazine. You don't have to send him £3, which seems a reasonable price to pay considering the effort he put into it. It's just a service fee (and many other Dragon User contributors) offers for those who can't face typing in the listing.

Print L

THIS is the first time I have written to your wonderful magazine. I congratulate your success at staying alive after Dragon died.

Let me get to my point. I have found a function on the

Dragon Pal is not mentioned in the (pdf) manual. Typing 'PRINT L' will produce the variable's value plus two spaces, followed by a zero. I have no idea what this means. Could you please help me.

Paul Jones
7 Chertemps
Stretley
Felford Salop

Super!

I HAVE read your letter about the Super Dragon Writer 2 in the September issue of Dragon User, and hope that my own experiences with this cartridge may be useful to you.

Like you, I initially experienced crashes, which I found to be caused by the cartridge being a loose fit in the expansion socket. Wedging the cartridge in the central position using two pieces of paper folded to the required thickness alleviated a complete cure.

With regard to your question about mains voltage dips, devices providing continuity of supply are available, but cost a lot more than your Dragon's much cheaper alternative which would give some protection against very short term dips in fact not high voltage variations inside the Dragon on the DC power rails. The Super Dragon Writer 2 cartridge does not use the 12V supply, only the +5V.

I have also found that using <clear>=><shift down>=>to go to the end of a file after editing the middle sometimes causes a crash, so I try to use some other cursor movement first.

A few other idiosyncrasies I have noticed are: <shift>-<clear> does not work; I have to program another key to get ASCII 92; spaces immediately after a printer code marker <clear> are ignored; the solution is to make the first one a hard space. Programmed functions do not work in the LDCATB command, no solution found.

I hope you manage to crashproof your cartridge and are able to use it, it is certainly the best not-discarded word processor for Dragon I have seen.

Bryan Maylor
36 Laurel Drive
Willesden
South West L84 1TW

Thanks

SEPTEMBER Dragon User published a letter of mine seeking advice about problems with the Super Writer 2 word processing program, and I have had a number of direct replies (at least one of which may also by now have appeared in the letter pages) to the effect that cartridges are prone to poor contact problems, which can be resolved by wedging a piece of Formica, or a fine thickness of paper etc, above the cartridge. I have tried this, and the crashes appear so far to have been eliminated. Any reputation on the reliability of Super Writer 2 is heavily withdrawn.

Dragon users should take heart from this. If they have problems, help is never far away!

Robert Hudekel
4 Labor Street
London SE16 5DR

Belgian answers

TO ANSWER Compuware's question to what we want of the Dragon I can say this: Due to the lack of purchasing power in Europe (sometimes five or 10 times less than in the USA), European families are not in the position to buy expensive Deputives, monitors and Printers or whatever. The outcome is if we want to classify the Dragon under a "home" computer, the manufacturers should hold that in mind. We have seen the problems that Apple or others have now to go greater and higher in memory expansion, the result is that the machines are too expensive for families to buy and they get into trouble and the stores of the shops are bulking out of unsold and out of date "home" computers. Please better it to upgrade the graphics (and sound) and make the 6400 a better machine than to make a machine which is too expensive to buy. Motorola has now given the opportunity with the new 68MC and 68MC487 and 68MC488, and updated version of the old ones — why not have them installed instead?

Homecomputers are for the

HOME and not for the business people, which market is completely different and have choice enough.

It is do not hold that instead then the Dragon is lost for the Home computer market anyway.

Martin Van Marneke
6809 Dragon Co-Go
Users Club
3 Janssensstraat
Coudenberg 6500
Belgium

68 Micro Group

THE 68 Micro Group have a new Committee and all Membership enquiries should be addressed to Mr J Turner, 68 Micro Group, 63 Millers Road, London E11 4JH.

All other enquiries should be addressed to Mr J Cunningham, 68 Micro Group, 7 Harpenden Court, Harpenden Road, Luton LU2 0SR.

The Group is a user group which has its main interest in the 68000 CPUs. This at course includes the Dragon and Tandy Co-Go among others. Meetings are held every fourth Tuesday, updates in a private Room, at the Prince Albert of Camdenland, Albany Street, Regents Park, London. The future meetings are September 3, October 1 and 29, November 26, and the Xmas Party on December 17. Subjects at the meetings cover a wide spectrum (J Turner).

J Turner
68 Micro Group

DOS thanks

AJ LONG last year wrote an article on Dragon DOS with 2 programmes, both of which are what I have been looking for since I bought a Disk Drive. I can now do fairly with my cumbersome Card Index.

I have unfortunately been unable to make Function 4 perform without getting Error 154 (Read Past EOF) in line 4100. I have checked and am unable to find out why. Any suggestions please!

R B Howell
17 St Albans Ave
Southsea
Hants PO4 0GB

News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343

6809 Show blues!

COMPUTER Marketplace, the company which was organising the 6809 Show, amongst others, has gone into liquidation along with its parent company, the South-west Data Group.

The 6809 Show, however, will still be held on Saturday 23 and Sunday 24 November at the Royal Horticultural Halls, London under

the control of a new company, Edlonschema Ltd. According to Mark Simon of Edlonschema, "some of the directors of Computer Marketplace organised a managed buy-out of the company's assets, and formed Edlonschema."

He said that the 6809 show would continue with "no problems at all — the

venue is booked under the new company's name, and all the exhibitors have been informed."

Edlonschema is guaranteeing that all stands booked and tickets bought will be honoured.

Edlonschema can be contacted at 181 House, 447 High Road, Finchley, London N12 5AF.

Not the 6809 Show

HARRY MAGGEE of Computape has decided to organise his own Dragon Show at the beginning of November — Sunday 2 to be precise.

To be held at the Methodist Church Hall in Maidstone, Kent, admission will be 80p — or free with this issue of *Dragon User*.

There will be software, hardware, books, printers and cassette recorders for sale.

Computape can be contacted at 27 Cornbe Road, Southminster, Essex CM8 2AH.

Eclipse

TOTAL ECLIPSE is the name of a new game from Eclipse Software of Birmingham.

Financial Director Derek Cooper described it as a "real time space arcade adventure." The game has 1,000 objects at present, 75 per cent of which are planets. Eclipse are working on routines to increase that number to 10,000 objects.

Your ship can carry up to 12 items to trade. When you have amassed enough money, you can buy information which helps you to find a shard which unlocks the dimension game is the next part of the game.

According to Cooper, "people prefer the game to *Elite* and *Altair* — and it's also the only Dragon game to be converted to other computers."

Total Eclipse will sell for £3.95.

Eclipse Software is at 11 Grassden Grove, Harborne, Birmingham B17 8LP.

Wednesdays and Saturdays from 7.00 pm to 10.00 pm, and on Sunday from 10.30 am to 10.00 pm.

BBS09 can be reached on 0705 736025 at the times given. Syssip is John Dunster.

Microdeal drops distribution

MICRODEAL, the Cornish software house is no longer to distribute its products to other companies. This means that people who want to buy Microdeal, Pocket Money, Tom Mo or Salamander games will only be able to get them by mail order from Microdeal, Microdeal's mail order arm.

John Symes, Microdeal's managing director, claimed that the company was not pulling out of the Dragon market, however.

"We have decided to continue full support for the Dragon in 1988," he claimed.

Microdeal has already re-



leased one new game for the Dragon, and has another three planned for November.

The game that has been released is *Module Man*, a 15-screen arcade game.

The three in production are *Trekbox*, a graphic adventure set in space in which the player has to save the human race from an alien plague, *Space Wreck*, a 3D space arcade game, and *Shock Trooper*, a multi-screen arcade game.

All four titles are on the Microdeal label at £8 each.

"There will be more Dragon games," John Symes said. "We are close to signing contracts on three others at the moment."

Microdeal can be found at 41 Tren Road, St Austell, Cornwall PL23 5JZ.

Barons of Ceti V

WINTERSOFT has changed the name of the new game it was to launch soon, and has split it into two parts which will be released separately.

The first part of *Jenitapoulin*, the Lords of Midnight style adventure game which is to be the company's first Dragon release since *Return of the Ring*, is to be renamed *Barons of Ceti Five*, and will cost £8.95, it should come out within the next month.

The second part is to be called *Usurper of Rime*, and will be released in a few months.

Wintersoft is at 30 Uplands Park Road, Enfield, Middlesex EN2 7PT.

Danish megabytes

QSS USERS who wish to expand the capacity of their disk drives might want to contact Hans Christian Andersen, of H C Andersen Computing in Denmark.

He has created a system running on QSS which can provide up to one megabyte storage per side of disk.

"If you have an QSS system with 300K disks, then you can get an ex-

tra drive with two megabyte capacity — four on a double disk drive," he claims.

The cost of the add-on is around £180.

He has also written a conversion package for the Dragon which, he said, "makes it possible to link Dragons to other computers."

H C Andersen Computers is at Amager Strandvej 418, DK 2770 Kastrup, Denmark.

Jumper

PERFECT for building Harvey Smith's *Show-Jump*, which lets any number of disks compete over time-different courses.

Show-Jump costs £8.95 from Computersave, PO Box 518, Stoke on Trent ST9 4JL.

BBS 09

BBS09 is a new bulletin board dedicated to Dragon running QSS software.

It functions on

Clay shooting!

Steve Gathercole gives you a chance to practise an outdoor sport indoors — without bloodshed!

THE CLASSET of Clay Shoot is quite simply to shoot everything that moves! You do this by using the right joystick for side-to-side, up and down, and diagonal movement of your sights, and the fire button to shoot. Be careful, though — you only have 20 shots.

Once you score five hits, one of the clay pigeons will speed up.

You score more for hitting the birds, or a clay pigeon more than half way up the screen.

The game is quite hard at first until you master the art of 'ticking' the sight sideways or diagonally, and then using the smooth-up and down movement to zero in on the target.

Don't be tempted to sit still and wait for the clay or bird at the beginning of each round, as nothing will happen until you move the sight.

The Listing

To type in the game, proceed as follows. First type in listing 1. This is the main 'runner' for the game and includes the Hall of Fame. Do not run this yet, as it will call up machine code routines which are not in memory at the moment. Check carefully, then save to tape as normal.

Next type in listing 2. This is the screen display. Run it, and, if everything looks okay, save this directly after listing 1 using CSAVE:MSCLIN, 1526, 1676, 6744.

Now comes the boring bit. Type in listing 3 — this is the hex loader for the machine code. Run this program; it will ask you for the start address. This simply means the number in the left hand column of listing 4, which is 10050. The program will then wait for you to enter the row of hex digits — the middle column of listing 4. After this, you must enter the checksum, which is the

right-hand column, including the = sign. If everything is all right, the program will carry on. If something is wrong, it will report an error.

When you have finished typing in listing 4, save it to tape directly behind listing 2 using CSAVE:MSCLAYSHOOT, 10050, 67666, 67666. Rewind the tape and you are ready to go. Just load in listing 1 and RUN.

If you have any problems, then write to me, Steve Gathercole, 16 Hainsworth Estate, Walslop St Andrew, Walsby, Cantos WA6 9E134, enclosing a stamped addressed envelope. If the listing is too much for you, I can supply a copy of the game for £1.50.

If, like me, you are a beginner in machine code and are wondering how some of the routines work, then write to me, enclosing a stamped addressed envelope and I will tell you how I did them.

LISTING 1

```

10 *****
20 * *
30 * * CLAY SHOOT *
40 * * BY *
50 * * *
60 * * STEVE *
70 * * GATHERCOLE *
80 * * *
90 *****
100 CLR
110 FCLRARR
120 CLR# 200,10000
130 CLS2
140 PRINT$1%,"LOADING MACHINE CODE";
150 CLOADR:CLOADM
160 PCOPY1 TO 5
170 PCOPY2 TO 6
180 PCOPY 3 TO 7
190 PCOPY 4 TO 8
200 TB="STEVE":CB="DONALD":GB="MIC
KY":EB="WINNIE":FB="FROGLET":AB=0
A2=1:AB=0:AA=0:AC=0:AG=0
210 POKESHS32,SH30
220 POKE SH5766,0:POKESHS767,0:POK
ESHS766,0:POKESHS769,0
230 POKE 21777,70
240 PCOPY 5 TO 1
250 PCOPY 6 TO 2
260 PCOPY 7 TO 3
270 PCOPY 8 TO 4
280 PRODE 4,1:SCREEN 1,1
290 EXEC 10050
300 EXEC SH3046
310 SC=PEEK SH5766:IB=PEEK SH5766
3
320 A1=SC:CLB RND 99:PRINT$09,"FIN
AL SCORE WAS":SC;
330 IF A1=96 THEN PRINT$96,"":IMP
UT "YOUR NAME":ZB ELSE 360
340 IF A1=92 THEN AG=AS:AS=AA:AA=A
3:AG=A2:A2=A1:FB=CB:CB=04:04=CB:CB
=TB:TB=ZB:GOTO 360 ELSE IF A1=93 T
HEN AG=AS:AS=AA:AA=A3:AG=A1:FB=CB:
CB=04:04=CB:CB=ZB:GOTO 360 ELSE IF
A1=94 THEN AG=AS:AS=AA:AA=A1:FB=E
4:E4=04:04=ZB:GOTO 360
350 IF A1=95 THEN AG=AS:AG=A1:FB=E
4:E4=ZB:GOTO 360 ELSE AG=A1:FB=ZB
560 PRINT$176,A2"BY " TB:PRINT$2
34,AG:"BY "CB:PRINT$236,AA:"BY
":98:PRINT$362,AS:"BY "CB:PRIN
T$426,AG:"BY "FB;
370 PLAY"0215V15CV10CV50P100V15FV1
0FV50P200V15SV15SV50CP200V15V150V5
0V15FV15FV50P200V15AV15AV50CP100V
15CV10CV50V2C"
380 PRINT$486,"ANOTHER GAME (Y/N)
?";
390 GB=INKEY$:IF GB="" THEN 390
400 IF GB="Y" THEN 210
410 IF GB="N" THEN END
420 GOTO 390

```

LISTING 3

```

10 PMODE 4,1:POL2
20 DIM T(24,24)
30 C=1536
40 FOR Y=1 TO 34
50 FOR T=1 TO 3
60 READ A:FOR C,A
70 C=C+1:NEXT T
80 C=C+24
90 NEXT Y
100 DATA 0,224,0,1,144,0,3,184,0,15
,40,0,31,156,0,28,143,0,57,199,128
,40,237,120,180,243,192,240,288,19
,3,243,189,224,251,24,160,244,220,3
,3,14,237,32,52,79,224,25,60,192,0
,220,0,0,224,0,0,224,0,0,224,0,0,2
,24,0,0,224,0,0,224,0,3,240,0
110 GET:DO 80-(32-24)*T,6
120 PMODE 4,1:SCREEN 1,0:POL2
130 DRAW "SDBM18,2L60366D4L68M20,3
66L60766M20,20766U7L68M20,207U766
24L582F20M4,20766L6U966L60C4"
140 DRAW "DM180,2L60366D4L68M184,20
7U666D6U76M192,20766U7L68M200,266L
6076M212,2L60366D4L6"
150 LINE 0,180-1256,180,PSET
160 LINE 0,127-1256,127,PSET
170 FOR X=0 TO 96 STEP 15
180 PUT C,1660-C+24,1980-T,OR
190 NEXT X
200 PUT 1440,1661-1164,1980-T,OR
210 PUT 1159,1661-1179,1980-T,OR
220 PUT 1289,1661-1224,1980-T,OR
230 PUT 1225,1661-1259,1980-T,OR
240 GOTO 240

```

LISTINGS

```

10 CLS
20 REM HLOADER - ENTER THE
30 REM STRING OF HEX DIGITS FIRST
40 REM AND THEN THE CHECKSUM
50 CLEAR200,10000
60 PRINT"ENTER START ADDRESS";:INP
UT START
70 PRINT"ENTER FINISH ADDRESS";:IN
PU FINISH
80 FOR N=START TO FINISH STEP 11
90 PRINT";";:
100 TT=0:INPUT A4:Z=0
110 FOR G=1 TO LEN(A4) STEP 2
120 P=VAL("BM" + MID(A4,G,2))
130 TT=TT+P:POKE (N+2),P
140 Z=Z+1:NEXT
150 PRINT": ";
160 INPUT T4
170 IF T4 <HEX(10) THEN SOUND 20
,30:PRINT"ERROR - ENTER LINE AGAIN
":GOTO 100
180 NEXT

```

LISTING 2

19974	8F4D98FF60873641234A0266	=	538	28114	88F000000000000F00011F8	=	277
19981	FF6184F787F7F8184FF63084	=	648	28125	8820F04818400000F00001	=	20F
19972	7FB7F03084FF230A008878F	=	608	28136	F00000F000000000000000	=	1FD
19983	23F040C71A049371211034E	=	36A	28147	91F0000000000000000000	=	139
19984	1F2343CE40E9FF406F73418	=	4C2	28158	0000000000000000000000	=	8
19985	06FCF7FF20891F26FC0AED4	=	608	28169	0000000000000000000000	=	8
19916	7FFF20081FF26FC0AED4A42E	=	511	28180	0000000000000000000000	=	C
19927	082626A0E426CE10AFC637	=	509	28191	003F00007F0000FFC0001E	=	31B
19938	F7FF233C824D0E991000D5C	=	508	28202	00003F00007F0000000000	=	13E
19949	00002000FF91000D110005	=	306	28213	1000003F00000000000000	=	50
19960	37000D3000000000000000	=	302	28224	00000000000000003A36000	=	1A7
19971	8D42000E300000000000049	=	381	28235	123580400000004E21811F10	=	32C
19982	00004000FE400000520078	=	319	28246	2705240001000103253001	=	289
19993	400000400000FF160F1200	=	2E2	28257	C10220000100004E230000	=	273
20004	000000000000000101010E7	=	12F	28268	C61F170226300010000E28	=	26A
20015	E71818100100FF00C1000E	=	30B	28279	04000C1F17050FF1700000	=	348
20026	000C00FF1300000F021200	=	315	28290	4E214C074E211705103506	=	28F
20037	8106510014000000000000	=	155	28301	004E23010001027004F0004E	=	304
20048	0010000000000000000000	=	91	28312	21011F1027000100004E23	=	283
20059	C0100100000C00004000003	=	177	28323	00400C1F17010200000010	=	381
20070	0C0001F00000F00000F000	=	2E5	28334	004E2300000C61F17000010	=	352
20081	0000000C03F00004000000C	=	1E4	28345	0101004E22040870022004E	=	040
20092	0001F00000000000000000	=	209	28356	210270021170047350000	=	016
20103	600000F00011F000020000	=	372	28367	002701300102700000000021	=	320

IT'S ON
AGAIN!

The 6809 COLOUR SHOW

FOR DRAGON AND TANDY USERS



SATURDAY 23rd and SUNDAY
24th NOVEMBER, 1985

ROYAL HORTICULTURAL
HALLS, VICTORIA.



The first one was good, the second better, but this one is going to be amazing.

NOT JUST A SHOW!

A weekend of fun, information and bargains. We are organising special events for everyone to join in, competitions with prizes and an advice centre. The exhibitors are promising to bring along lots of bargains as well as new products.

The third 6809 Show isn't going to be just a show, it's going to be a definitive showcase for 6809 users.

A GREAT VENUE!

If you don't know the way to the Royal Horticultural Halls lay now, let me just say it's in the heart of Victoria, in between Parliament Square and Victoria Station. Easy to get to and from.

BOOK NOW, BEAT THE QUEUES AND ENTER THE PRIZE DRAW!

If you book tickets in advance you stand a chance of winning over £150 of 6809 related products. And you'll miss the queues—at the last show there was a five hour queue but you'll just walk right in. And you'll save £1 per ticket.

This exhibition is organised by:
Computer Marketplace (Exhibitions) Ltd.,
Part of the Bushworth Sales Group,
38 George Street,
LONDON WC2H 7ED

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28379 811F1827849018004E2386 = 380
 28389 880C1F1781AC2888811888 = 380
 28398 4E2888480C1F1785441784 = 384
 28411 98884E224CB74E22884E31 = 448
 28422 4C874E2117848625843436 = 368
 28433 84FF23888887F237F8147 = 568
 28444 8E8778848881784888818 = 571
 28455 78814728F388FF23863787 = 527
 28466 FF2317846C178884388884 = 419
 28477 814787FF2888414826F039 = 488
 28488 35863428884E2181881827 = 322
 28499 842F888158818225288180 = 208
 28518 1822888818884E22888886 = 2FD
 28521 1F17812A881F18884E2888 = 248
 28532 888C1F1784E317818F884E = 316
 28543 2148874E21178481C35888 = 359
 28554 4E228188182788F8884E21 = 348
 28565 81881827888F18884E2386 = 339
 28576 888C1F1784FF13888F1888 = 38A
 28587 4E2888888C1F1784891788 = 2C7
 28598 88884E2248874E22884E21 = 491
 28609 48874E2117888F8588884E = 444
 28620 2281381827888884E22181 = 278
 28631 881827888818884E228888 = 37F
 28642 C81F17888888888F18884E = 34F
 28653 2888888C1F178488178894 = 30C
 28664 884E224E374E22884E2188 = 488
 28675 874E211787883588342888 = 3C5
 28686 4E22818818278874888188 = 288
 28697 813C1822F88818831822FF = 413
 28708 8418884E2288888C1F1788 = 2FD
 28719 6788888818884E2888888C = 428
 28738 1F17841F884C884E224887 = 359
 28741 4E2217888935884C348884E = 31C
 28752 2281381827888888815881 = 288
 28763 5C1822FF84E81831822FF84 = 38F
 28774 18884E2288888C1F882738 = 366
 28785 888818884E2888888C1F17 = 389
 28796 838F888884E2248874E22 = 414
 28807 1783193588343888878888 = 317
 28818 1F28FFC35883438847C2888 = 565
 28829 478834884E2887732813588 = 54A
 28848 3438884E38818822881781 = 268
 28851 C7884E2C881812788818227 = 364
 28862 8881832788884E34388888 = 288
 28873 4E3828888884E382888F84E = 3C5
 28884 3C181271CC1822732C183 = 338
 28895 18278888C1841827888F1C1 = 323
 28906 881827888C186182788188 = 226
 28917 18884E3588888C181788884 = 381
 28928 C882F74E33888888C18888 = 457
 28939 8884188F4E48F4E4C3C181 = 483
 28958 2788C1822788C1827888F8 = 206
 28961 4E382888884E382888F84E = 321
 28972 38C3888888FF4818884E88 = 8C3
 28983 8888C1817812888888888 = 32F
 28994 18884E788887C8181788287 = 388
 21885 C888F74E33888888C18888 = 458
 21816 8884188F4E48F4E4C3C181 = 412
 21827 3888FF48188C4E888888C6 = 484
 21838 1D1788F6388888C18884E = 38F
 21849 888888C18178288C888F7 = 484
 21858 4E33888888C1888888418 = 38C
 21871 8F4E48F4E4C3C18FF7C3888 = 517
 21882 FF48188C4E888888C1817 = 46F
 21893 88C1388888C188C4E2888 = 444
 21884 84C81D178828C88F74E33 = 3C1
 21815 388888C18888884188F4E = 388
 21826 48F4E4C3C18FF473888F88 = 514
 21837 18884E888888C18178888 = 38C
 21848 388888C18884E88888C8 = 458
 21859 1D178827C888F74E338888 = 37C
 21878 88C18888884188F8C88F8 = 415
 21881 4E3C18FF128888FF881888 = 447
 21892 4E878888C188888888888 = 419
 21893 C818884E88888C1817882 = 38F
 21814 15178175C88FF74C338888 = 38A
 21825 FC8818888884188F4E48F8 = 491
 21836 4E3C18182788C1827888C1 = 32F
 21847 8327888F4E3828888F8C88 = 284
 21858 2888888888FF74E3C3888 = 483
 21869 83C818884E888888C1817 = 3F3
 21888 88888FF74E3138883488F = 3F7
 21891 C8E8418F81A88847888888 = 4F2
 21882 8428F3388138884C32888F = 535
 21813 88FF8818C1842888C18824 = 489
 21824 88C1F82888C881F74E3C38 = 474
 21835 82C888F74E3C3288C8888F = 582
 21846 4E3C32888888F74E21881F = 3C8
 21857 874E22888114F18884E2888 = 382
 21868 88C1F17819F8881874E31 = 381
 21879 8881874E3388F74E38874E = 44C
 21888 3C188888C1188F84C1888 = 394
 21881 8888188F4E38188888C18 = 38C
 21412 8F4E388C13888F84E3C8888 = 583
 21423 18F84E488881F74E4C2888 = 517
 21434 74E47C8C1531F84E48C8881 = 4E3
 21445 F74E4288FF74E46C81538F8 = 58F
 21456 484888872178F8F888188 = 44E
 21467 813C28831782C888441888 = 358
 21478 4E288888C1F8888188881 = 382
 21489 888183228317FC11882888 = 397
 21588 81888183228317FC888821 = 38C
 21511 888158818C258317FC8888 = 492
 21522 1518884E88838188F88888 = 33C
 21533 188C888122831788882888 = 188
 21544 343888F88817E28831788 = 459
 21555 8881F8388317888F388888 = 558
 21566 1F878E2135888F874E2135 = 3C8
 21577 884F874E223588888888888 = 482
 21588 23588343618881778813F = 28C
 21599 28FFC38883488F84E31C188 = 4C0
 21618 278FF74E48C2C1812788C182 = 372
 21621 2718C183271C358818884E = 358
 21632 48813F188F4E48188C8888 = 28F
 21643 228317FC88888817888C88 = 414
 21654 8617818835883416C18127 = 339
 21665 88C1822788C1832718C184 = 3C8
 21676 271218884E888888888888 = 388
 21687 E7888618884E3288F18888 = 488
 21698 4E88834388888888888888 = 514
 21789 82FFC888FF7FF288C28F888 = 638
 21738 1F28F4883787FF23C88828 = 4F3
 21731 88888888888888888888888 = 8

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Dragon graphics

Key Codes on pictures for your Dragon

ACCESSING the Dragon's different graphics modes is very easy when done from Basic, but a little more involved when done from machine code. The method used to select a graphics mode, colour set and the base address of the screen has not to my knowledge been covered by one article before so that is what I shall try to do here.

Setting up the graphics modes of the Dragon is achieved in three steps. The base address of the screen must be defined, the 'bytes per page' must be defined, and finally the actual graphics mode to be used must be defined.

The first step is to set up the base address of the screen. This is an optional step and if omitted then the screen will reside at its default test screen location of \$400. Otherwise the screen may be located anywhere in memory from zero up to \$FFFF in steps of \$200. This is achieved by accessing memory locations \$FFC8 to \$FFC0.

The screen base address is represented by a seven-bit binary number. This number is the base address of the screen divided by \$200. For example a base address of \$400 divided by \$200 is two which, as a seven-bit binary number, is 0000010. The locations \$FFC8 to \$FFC0 need only be accessed for them to have an effect. I personally use a STA instruction as this is the quickest instruction that will access a location. The locations are assigned as follows:

Address	Function
\$FFC8	Clears bit 0
\$FFC7	Set bit 0
\$FFC6	Clears bit 1
\$FFC5	Set bit 1
\$FFC4	Clears bit 2
\$FFC3	Set bit 2
\$FFC2	Clears bit 3
\$FFC1	Set bit 3
\$FFC0	Clears bit 4
\$FFBF	Set bit 4
\$FFBE	Clears bit 5
\$FFBD	Set bit 5
\$FFBC	Clears bit 6
\$FFBB	Set bit 6

An example would be to set the screen base address to its normal graphics location of \$000. First we divide the address by \$200 which gives us three. This as a seven-bit binary number is 0000011 so we would need to set bits 0 and 1, and clear bits 2 to 6. The following routine will do this:

STA	\$FFC1	Set bit 0
STA	\$FFC5	Set bit 1
STA	\$FFC4	Clear bit 2
STA	\$FFC2	Clear bit 3
STA	\$FFC0	Clear bit 4
STA	\$FFBE	Clear bit 5
STA	\$FFBC	Clear bit 6

The above routine accesses all seven bits of the address. This is not normally necessary as the Dragon defaults to a base address of \$400 which only sets bit 1

(two by \$200 = \$400).

Now that we have the base address defined, the next step is to define the 'bytes per page' that the mode we wish to use requires. This is done in much the same way as the base address was defined. The 'bytes per page' or more correctly the VDG memory mode is defined as being a three-bit binary number as described in the table below.

VDG mem mode	Bit pattern	Bytes/page
0	000	\$12
1	001	\$24
2	010	\$248
3	011	\$28
4	100	\$372
5	101	\$372
6	110	\$144

The addresses used to set these are \$FFC0 to \$FFC8 and are defined as follows:

Address	Function
\$FFC8	Clears bit 0
\$FFC7	Set bit 0
\$FFC6	Clears bit 1
\$FFC5	Set bit 1
\$FFC4	Clears bit 2
\$FFC3	Set bit 2

An example would be to set the bytes per page to \$144, which is correct for modes three and four. The three-bit binary number for this would be 110 (6) and would be achieved by the following routine:

STA	\$FFC0	Clear bit 0
STA	\$FFC3	Set bit 1
STA	\$FFC3	Set bit 2

The final step is to determine which graphics MODE is to be used. Using the table below, select the desired mode from the left hand column to obtain the number required from either the SCREEN 1,0 or SCREEN 1,1 column.

The number obtained from this table must then be 'poked' into location \$FFD0 which is the VDG control. Only the five most significant bits are used by the VDG so it is wise to mask off the three remaining bits. The routine given below would be used to select PMODE4 SCREEN 1,0.

LDA	\$FFD0
AND	#B07
ORA	#B07
STA	\$FFD0

As a complete example, the routine given here would be used to select PMODE4 SCREEN 1,1 with a screen base address of \$200.

Finally, it may be worth pointing out that the setting up of graphics modes from machine code does not affect the locations in the Dragon's direct page which hold such information as current base address, current graphics mode etc. For the benefit of Basic users I have listed these locations at the end of this article. Basic users wishing to use the information in this article may POKE the addresses given above to obtain the same effect.

Location Contents

\$0	Current graphics mode
\$1-\$6	Top address of current screen
\$6	Bytes per row of current graphics screen
\$A-\$B	Base address of current graphics screen
\$C	Page number of current graphics screen

Table 1			
MODE	SCREEN 1,0	SCREEN 1,1	
Test/0-00	00	00	TEXT SCREEN
128 x 96 2 colour	06	06	PMODE 0
128 x 96 4 colour	0C	0C	PMODE 1
128 x 192 2 colour	0E	0E	PMODE 2
128 x 192 4 colour	0F	0F	PMODE 3
256 x 192 2 colour	0F	0F	PMODE 4

Table 2			
STA	\$FFC7	Set bit 0	
STA	\$FFC8	Clear bit 1	
STA	\$FFC4	Clear bit 2	
STA	\$FFC2	Clear bit 3	
STA	\$FFC0	Clear bit 4	
STA	\$FFC0	Clear bit 5	
STA	\$FFC3	Clear bit 6	
			This section selects the base address to be \$200
STA	\$FFC0	Clear bit 0	
STA	\$FFC3	Set bit 1	
STA	\$FFC3	Set bit 2	
			This section selects a screen size of \$144 bytes/page
LDA	\$FFD0		
AND	#B07		
ORA	#B0F		
STA	\$FFD0		
			This section selects PMODE 4 SCREEN 1,1

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Dragon Bingo!

No, not the latest in circulation boosters, but a basic listing for the kids from Pam D'Arcy

IN THE November 1983 issue of Dragon User, Boris Allen showed us how easy it was to get the Dragon to take charge of our party music. I quickly used his idea to provide impartially operated music for the likes of the children's games "Musical Chairs" and "Pass the Parcel", leaving me free to resolve the inevitable disputes without the distraction of operating the music at the same time.

My two children's current "fad" is Bingo, but neither (and certainly not *me!*) wants to be "caller" — so we've handed the job over to the ever-trusty, uncompromising Dragon. The RND function is such a useful instruction!

The resulting program allows for up to

80 number versions of Bingo and is written to use the right-hand joystick but should be easy enough to alter for non-joystick users. It uses simple chunky numbers built up from the yellow-text graphics characters in an eight by six character grid per digit that displays equally well on colour or black-and-white television sets. The minimal operating instructions are given in the program. As well as being a "number caller", a list of numbers still to be called can be displayed at any time (the few bugs in the listing is an additional marker disjunct hazard!).

For your typing convenience, there are few tabs, no REMs and I haven't renumbered in order to retain the "chunks" that

the program was built up in round line numbers. Lines 3000+ are the large digits 0-9 (Subroutine 3000=0; 3100=1; 3200=3, etc) built up from the yellow graphics characters (page 138 of the manual), values 344-359 being read into the character string array C\$ in line 58 to cut down on the CHR\$ typing in the print subroutines.

I reckon that the joystick should be placed on the floor and the fire button be foot-operated, leaving one's hands free to manipulate the markers. I somehow haven't had the opportunity to try the call as BOTH children now joined to be "caller"...

Have fun!

```
10 REM DRAGON BINGO - PAM D'ARCY JULY 1985
20 DIM C$(16)
30 FOR N=1 TO 16: C$(N)=CHR$(142+8*N):NEXT
40 GOSUB3000
50 PRINT
60 INPUT "TOP OF THE HOUSE NUMBER:" H
100 IF INT(H)<=H OR H<1 OR H>90 THEN PRINT "BETWEEN 1 AND 90, PLEASE":GOTO90
110 DIM MING
115 PRINT
120 GOSUB1000
200 FOR S=1 TO H:H=H-S:GOTO200
205 C=0:J=L=0
210 GOSUB2000
220 PRINT890,"LAST NUMBER: ";
225 IF L>0 THEN PRINT USING "##":L;
230 PRINT830,"TOTAL CALLED: ";
235 IF C>0 THEN PRINT USING "##":C;
240 PRINT850,"PRESS FIRE BUTTON TO GET NUMBER"
245 PRINT
246 PRINT"CENTRE JOYSTICK EXCEPT TO:"
250 PRINT" LIST UNCALLED NUMBERS: UP"
260 PRINT" NEW GAME      , DOWN"
300 J=RND(40):GOSUB1000
310 IF J<16 THEN 700
320 IF J>48 THEN 800
330 IF (PEEK(44700) AND 1)=1 THEN 300
400 FOR P=104 TO 396 STEP 32
410 PRINT8,STRING$(16,C$(1)):NEXT
420 IF C=H THEN PRINT160,"*PRINT*ALL THE NUMBERS HAVE BEEN CALLED*"STOP
500 J=RND(40):IF H<J<0 THEN 500
510 H=J+1:IF C=H+1
600 G=INT(J/10)
650 P=J-6
640 ON D= GOSUB3100,3200,3300,3400,3500,3600,3700,3800,3900
650 D=D+1:G=J-10
660 P=J-4
670 ON D= GOSUB3100,3200,3300,3400,3500,3600,3700,3800,3900
670 IF D=0 THEN GOSUB3000
680 IF L>0 THEN PRINT890,"":PRINT USING"##":L;
690 L=L-1
695 PRINT8349,"":PRINT USING"##":C;
700 GOTO3000
700 GOSUB2000
720 PRINT"LIST OF THE":G=C:J="UNCALLED NUMBERS"
730 PRINT8129,"":
```

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```

740 S=1
750 J=S+9:IF J=H THEN J=H
760 FOR S=0 TO J
770 IF H=0 THEN PRINT USING"## "1S; ELSE PRINT " "
775 NEXT
777 PRINT:PRINT " ";
780 IF J=H THEN 750
785 PRINT#444,"CENTRE JOYSTICK AND PRESS FIRE BUTTON TO CONTINUE";
790 IF (PEEK16HFF00) AND 11=1 THEN 790
795 GOSUB1000GOTO1230
800 GOSUB2000
810 PRINT
820 PRINT"START NEW GAME?"
830 PRINT
840 PRINT"YES - JOYSTICK TO CENTRE"
850 PRINT"NO - JOYSTICK UP"
860 PRINT
870 PRINT"POSITION JOYSTICK THEN PRESS FIRE BUTTON"
880 IF (PEEK16HFF00) AND 11=1 THEN 880
890 J=JOYSTX10+J+JOYSTX24
900 IF J=40 THEN 880
910 IF J<16 THEN 700 ELSE 200
1000 J=JOYSTX10+J+JOYSTX11:RETURN
1005 FOR J=1 TO 250:NEXT J
1008 GOSUB1000
1010 IF J=15 AND J=49 THEN 1060
1020 PRINT#444,"JOYSTICK NOT CENTRED. CENTRE IT & PRESS FIRE BUTTON
TO CONTINUE"
1030 IF (PEEK16HFF00) AND 11=1 THEN 1030 ELSE 1005
1040 RETURN
2000 CLS
2010 PRINT#10,"DRAGON KING"
2020 PRINT#40,"=====
2030 RETURN
3000 PRINT#P+2,C#101,C#131,C#131,C#131,C#131;
3010 PRINT#P+33,C#101,C#191;PRINT#P+37,C#151,C#112;
3020 PRINT#P+65,C#116;PRINT#P+70,C#161;
3030 PRINT#P+97,C#116;PRINT#P+102,C#116;
3040 PRINT#P+129,C#131,C#112;PRINT#P+133,C#101,C#191;
3050 PRINT#P+162,C#151,C#131,C#131,C#191;
3060 RETURN
3100 PRINT#P+2,C#121,C#131,C#111;
3110 PRINT#P+34,C#131,C#161,C#111;
3120 PRINT#P+67,C#161,C#111;
3130 PRINT#P+99,C#161,C#111;
3140 PRINT#P+131,C#161,C#111;
3150 PRINT#P+163,STRING$4,C#111;
3170 RETURN
3200 PRINT#P+1,C#121,C#101,C#131,C#131,C#131,C#131;
3210 PRINT#P+33,C#131;PRINT#P+36,C#116;
3220 PRINT#P+66,C#131,C#101,C#191;
3230 PRINT#P+99,C#141,C#131;
3240 PRINT#P+129,C#141,C#131,C#191;
3250 PRINT#P+161,STRING$4,C#111;
3260 RETURN
3300 PRINT#P+1,STRING$15,C#111;C#116;
3310 PRINT#P+34,C#141,C#131,C#131;
3320 PRINT#P+66,C#141,C#131,C#131,C#141,C#131;
3330 PRINT#P+102,C#116;
3340 PRINT#P+129,C#141;PRINT#P+133,C#121,C#116;
3350 PRINT#P+161,C#151,STRING$14,C#111;
3360 RETURN
3400 PRINT#P+4,C#101,C#116;
3420 PRINT#P+35,C#101,C#191,C#116;
3430 PRINT#P+66,C#100,C#191,C#111,C#116;
3440 PRINT#P+97,C#101,C#121,C#141,C#141,C#116,C#101;
3450 PRINT#P+133,C#116;
3460 PRINT#P+165,C#113;
3470 RETURN
3500 PRINT#P+1,C#116;STRING$15,C#113;

```

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3510 PRINT#P=53,C#1561;
3520 PRINT#P=65,STRING#45,C#1131;C#1521;
3530 PRINT#P=77,C#152;PRINT#P=102,C#181;
3540 PRINT#P=129,C#1050;C#1120;C#1130;C#1140;C#181;C#191;
3550 PRINT#P=162,C#151;C#1531;C#1531;C#1531;C#1531;
3560 RETURN
3570 PRINT#P=2,C#181;C#1131;C#1131;C#1131;C#1140;C#151;
3580 PRINT#P=33,C#1080;C#1490;PRINT#P=38,C#1131;
3590 PRINT#P=65,C#1161;STRING#14,C#1451;C#1430;
3600 PRINT#P=77,C#1561;PRINT#P=102,C#1141;
3610 PRINT#P=129,C#1181;C#1431;C#1530;C#1110;C#1121;C#181;
3620 PRINT#P=162,STRING#4,C#1131;
3630 RETURN
3700 PRINT#P=1,STRING#45,C#1130;C#1160;
3710 PRINT#P=37,C#181;C#1490;
3720 PRINT#P=68,C#1080;C#1490;
3730 PRINT#P=99,C#181;C#1490;
3740 PRINT#P=130,C#181;C#1490;
3750 PRINT#P=161,C#1530;C#191;
3760 RETURN
3800 PRINT#P=1,C#120;C#181;C#1131;C#1131;C#1131;C#1131;C#1131;
3810 PRINT#P=33,C#1161;PRINT#P=38,C#1161;
3820 PRINT#P=65,C#1450;C#1521;C#1490;C#1410;C#181;C#1490;
3830 PRINT#P=97,C#181;C#1491;C#1130;C#1110;C#1451;C#1531;
3840 PRINT#P=129,C#1140;C#1490;C#1130;C#1130;C#1490;C#1150;
3850 PRINT#P=162,C#1510;C#1130;C#1130;C#1130;C#1491;
3860 RETURN
3900 PRINT#P=1,C#1080;C#1150;STRING#13,C#1131;C#1521;
3910 PRINT#P=33,C#1161;PRINT#P=38,C#1161;
3920 PRINT#P=65,C#1161;C#1120;STRING#13,C#1410;C#1161;
3930 PRINT#P=102,C#1161;
3940 PRINT#P=129,C#1140;C#1430;C#1110;C#1130;C#1080;C#1490;
3950 PRINT#P=162,STRING#13,C#1131;C#1490;
3960 RETURN

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A Plus for the Dragon

Roy Coates reviews the Plus cartridge from Andek Data Design.

THE PLUS cartridge arrived in an extremely well-padded cardboard box along with a PLUS implementation guide and two floppy disks, one containing a FLEX system, the other a set of utilities. Some of these replace the standard FLEX utilities and others are Andek's own. The disks arrive wrapped in protective silver foil, but unlike sealed potatoes they should NOT be placed in the oven.

Physically, PLUS is well made and about twice the length of an ordinary Dragon games cartridge. The connector for the disk drives sits underneath the cartridge body and so provides 'legs' to support the unit, which takes the strain off the Dragon's cartridge connector. At the end of the cartridge are the two optional RS232 connectors. These are of the standard nine-way 'D' type.

The PLUS cartridge is not only a floppy-disk interface. It also houses a battery backed Real Time Clock (RTC) with 50 bytes of RAM, a 4K Monitor on board called ACE, the optional twin RS232 interface with hardware baud rate generators, and an optional 8K of RAM to allow FLEX to be run on a standard Dragon 32.

The Real time clock (RTC) is powered

by a small Mica battery housed within the cartridge and is charged by the Dragon when the Dragon is in use. Of the 50 bytes of RAM on board the RTC, 30 bytes are available to the user for whatever purpose is required. The remaining locations are used to hold information such as the date and time, all the terminal attributes normally set via the FLEX.TTYSET command, the disk configuration normally set by the FLEX.ASN command, the base address for the Dragon screen, the baud rates for the RS232 ports and which ports are to be used for Input and/or Output. Another location determines whether FLEX will automatically be booted on power-up. In practical terms this means that no setting up is required by the user when the system is booted.

Unlike the Dragon DOS or DELTA systems, PLUS does not interface to BASIC by adding disk handling commands. PLUS is a system in its own right. With the cartridge installed and the Dragon turned on, instead of the usual Microsoft Copyright notice, the screen is cleared to black and the ACE monitor heading appears followed by the ACE prompt: '+ >'. The text 'ACE' is displayed as green text on

a black background which is much nicer and easier on the eyes than the Dragon's normal black on green display.

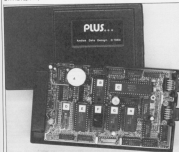
The ACE monitor contains some 25 commands each of which is initiated by typing the first two letters of the command. For example, the Display disk command 'DCLDCK' is called by simply typing 'DC'. Many of the ACE commands are intended for the machine code programmer as they perform such operations as examine and/or change locations in memory, read or write a physical disk sector, display the contents of the 16Bit registers etc. Two of the commands are used for setting up the RTC with commands like DClock which displays the contents of the RTC's RAM, and MClock which enables you to alter the values held in the RTC RAM. There are two very useful commands in ACE for the BASIC user, these are BA (Basic) and CT (Cartridge). The first command simply puts the Dragon back into its native Basic (without corrupting memory). The second is a little cleverer in that it allows cartridge software to be run in the extra 8K of RAM included in the PLUS cartridge.

There are two ACE commands for leaving in a disk operating system, these are 'BD' and 'DB'. The first command 'BD' searches the disk for a file called FLEX.SYS or FLEX.COM and boots the system accordingly. The second command, 'DB', reads track one of the disk to load in a custom boot routine such as that used by Compuserve FLEX to generate the 51 column display. Having booted the FLEX disk the utility disk supplied with the cartridge was catalogued to reveal that there are literally dozens of utilities supplied, many of them having their source files available so that they may be modified to suit the user. Some of the utilities are peculiar to the PLUS system in that they perform such functions as setting the date and time for the RTC or pass control back to ACE from FLEX etc. The remainder of the utilities are either improved versions of standard FLEX utilities or are original Andek programs.

If the FLEX disk was booted via the 'BD' command, the user may easily alternate between FLEX and ACE. This is very useful as it allows the setting of such things as the baud rates for the two RS232 ports without having to re-boot the system. The RS232 ports may be configured in such a way that a terminal may be used instead of the Dragon keyboard and display. This greatly enhances the Dragon with a proper 80 column display. The PLUS cartridge used for this review has been used with a G4C VT100 terminal, a DEG VT52 terminal and a BBC micro running an emulation program, all at 9600

Key to photograph:
A ... Mica battery
B ... RTC and RAM
C ... Display disk controller
D ... RS232 Input/Output

E ... 8K RAM
F ... 4K Monitor (ACE)
G ... ACIA 1
H ... ACIA 2



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based with no problems encountered. Again the RTC can be used to some advantage as it allows the user to specify which ports are associated with I/O. This may be stored in the RTC RAM and these ports then become the default on power-up of the system.

The R5000 ports are not just for use with a terminal, they may also be used to interface PLUS with another computer system, a serial printer, a modem or just about anything else that uses R5000. It is not necessary to go to the expense of buying a terminal for use with PLUS. If you are using Compuserve PLUS then you will have a 54 column display. (Dragon 64 only) or you may use the new Hi-Res screen drivers from Andtek which gives a choice of either a 52, 54 or 64 column display on either a 32K or 64K machine.

The manual supplied with the PLUS interface is a very thorough one and gives details of all the ACE facilities, the FLEX utilities supplied with the system, memory locations used by PLUS and for the technically minded, the data sheets for the chips used in the PLUS interface are also given.

It would be impossible in the space of this article to explore all the possibilities available with PLUS if the user to which this interface may be put will be determined by the individual users requirements.

PLUS has many things in its favour. It is about the only way of expanding a Dragon towards being a 'proper' development system. PLUS is primarily intended to be used with the FLEX operating system. This

is a well-established system which has a rapidly growing user-base. There are a great many software packages currently available for it and it is a very easy system for the hobbyist to experiment with.

In conclusion, the price may seem high when compared to a Dragon DOS or

DOS, TA cartridge. However, when the features of the different cartridges are compared then the price becomes very reasonable indeed. In fact if the components and software are priced individually then PLUS becomes something of a bargain.

'ACE' monitor commands

Command	Use
AA	Auto advance of ACE commands.
BA	Return to Dragon BASIC.
BC	Complement screen background from dark to light etc.
BD	Load FLEX system disk.
CP	Continue program after SWI.
CT	Move 8K of data from 02800 to 0C000 and jump to BASIC cold start.
DB	Boot system disk.
DC	Display contents of the RTC RAM.
DI	Display the contents of the 6800 registers.
JF	Return to previously loaded PLUS.
JJ	Jump to specified address.
LD	Load memory with text from the keyboard.
MC	Modify the contents of the RTC RAM.
MD	Hex ASCII dump of memory from specified address.
ME	Examine specified memory location.
MF	Fill specified portion of memory with specified byte value.
MP	Poke specified memory location.
MS	Shift specified block of memory to specified address.
PP	Run program from specified address.
RS	Reset a disk sector.
SB	Set the baud rate for the specified port.
SC	Change screen base address.
SI	Specifies input port.
SO	Specifies output port.
ST	Set disk stepping rate.
WS	Write a disk sector.

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Really Cosmic!

Program: Cosmic Crusader, Bialy Software, Crossways House, Lutterworth Road, Bialy, Leicester
Price: £3.99

COSMIC CRUSADER is the best space shoot-em-up arcade game I have ever seen for the Dragon. You are in charge of a space ship flying through the galaxy trying to kill all the enemy forces.

The game plays in a strange mixture of 2D and 3D with a

ship at the bottom of the screen which doubles as a laser gun on the overall view.

There are 34 screens according to the author. To give some idea of their merit I will detail those I have completed (this may be a short review — the game is very difficult).

Screen one consists of happy smiling faces which beam in until three are present and attempt to clearly blast you to

high hell! They're nice graphics, and they move smoothly and pleasantly.

The second and, so far, most graphically impressive screen contains TIE fighters from the Star-Wars mythology spooling in and out in 3D towards and away from your ship, dropping pulsating laser balls at you.

The third screen is a meteor storm — simply avoid the meteors — in 3D. Some find this screen very graphically impressive but I feel that it's a little disappointing.

The fourth screen has millions of indescribable space invaders swarming you, whilst screen five is similar but with rotating and plying flying saucers.

If my memory serves me correctly (I have only got this far once) screen six is an anti-matter storm which is a meteor storm in 2D with the meteors shootable.

Screen seven gives the player flying saucers which tower just above the sight limit, seem to drop a burst of

bullets, and run away again (space guerrilla?).

And that, I confess, is as far as I've got (but this is not a game that makes me want to stop playing, I will survive, I will win. And all that).

The controls are either simple or complex depending upon your style of play. There are controls for left, right, and fire which are essential. But there is also a sight which can be moved up and down for those who love Diapause complexity on a game.

There is an added twist in this game in that the player has a continually decreasing fuel supply that needs to be regularly replenished. Although the refuelling is a simple procedure, keeping one eye on the fuel gauge is difficult when fighting off half of the galaxy's enemy forces.

A very good game, which should be a part of everyone's collection.

Jason Orban



Dashing Diamonds

Programs: Diamond Dash 1, Diamond Dash 2, Starship Software, 23 Telford Road, Chesham House, Chesham 8583 TGF
Price: £3.99 each

THIS MONTH appears to be the month of the **SHOOT 'EM UP** clone with no less than four versions arriving on my desktop! These are the first two, from a company of whom I have never heard.

Sadly, this situation has now changed and Starship Software have taken under the aegis of the ruthless publisher those who are physically revolted by the sight of freshly drawn splines should stop reading this review here!

This game does not adhere closely enough to the original formula to allow me to avoid describing it! The idea is to control Harry the Headbanger as he attempts to collect all the diamonds on the screen. He must climb ladders and jump holes, but the main challenge comes from the clock — time runs out very quickly.

In **Diamond Dash 2** the game becomes more complex with the inclusion of springboards and spikars, but doesn't become any more fun.

There is an option to design your own screens, adding the ones that exist already — this is a very highly commendable feature of the game, the best part of it in fact as these screens can be saved to and loaded from tape.

Considering the time spent on this section, it is very sad that the game plays so badly! Harry the Headbanger looks like he has some sort of

muscular disease. He jinks from location to location with almost unrelentingly crudely. The climbing of ladders is exactly the same as the jumping of platform levels and the game is not smooth enough to allow the jumping to have a great deal of skill in it.

This game would probably have been acceptable before **Manic Miner**, **Scramble**, **Atari**, or **Demons of Chaos** (indeed elsewhere) but now must come a poor second.

It reminds me very much of **Duckie's Dee** without the realism, especially in the way it plays. It is afraid it must receive almost the same overall rating.

However, I can see it having some appeal when people start to design their own screens for their friends.

My advice for **Diamond 2** is to write the game play routines to make them a lot smoother, forget scrolling on the screen — it takes far too long and is even more irritating than games that play too long a burst of music before every life; allow the man to jump further; add an option to use the keyboard — these are not games that need joystick control, however easy it may be to do in machine code. With these alterations and the same screen designs you will have a very playable game.

The clones are becoming a very interesting field of study as each seems to surpass the former in merit or class ineptitude.

Jason Orban



Swoop!

Program: Star Swallow, Bialy Software, Crossways House, Lutterworth Road, Bialy, Leicester
Price: £1.99

THE FIRST of my bunch of games from Bialy Software is a fast-action Mode 2D shoot-em-up space.

The idea is to mercilessly decimate the Zargon Fleet, by shooting them with your ship at the bottom of the screen. The game is very simple, just move left and right, and destroy as many of them as you can.

The Zargons, a particularly nasty form of alien, swoop in from the top of the screen, make slow but first circular motions above you and then die.

The game is played out against a starry scrolling background which utilises one of the more useful of Mode 24's quirks. Your ship is quite disappointing to look at, bearing more resemblance to an Egyptian Pyramid than a high-powered assassination machine, but this is a very small flaw in the graphics

which are exceptionally smooth and clear.

The sound too is very good, and is co-ordinated nicely with the graphics to help the mood of the game.

For all its superb programming, though, the game has a rather voluminous fault — it doesn't change. The aliens begin to fire after a while, and they get faster until they are too fast, but they don't end. There are rarely more than three at a time on the screen, and after a while the game becomes simple, repetitive and — dare I say it? — boring.

It is a great pity that the author of this program has written an excellent piece of code but failed to add the very little extra that would have turned it into a big hit.

I may be doing this game an injustice, in that I may not have played it enough to have become sufficiently good to complete the first set of aliens, but, to be brutally honest, I have no wish to play it any more.

The advertising blurb for the game is very true and can, in any case, be taken literally, it is not as intended.

Jason Orban

Endless Crosses?

Program: *Endless Thoughts and Crosses*, R & P International, PO Box 129, Wembley, Middlesex HA9 2UG

"ENDLESS" is perhaps a touch exaggerated, but this is certainly a jumbo-size version of the old favourites, taking place on a 14 x 10 grid on which the aim is to place five thoughts or crosses in a row, like an elongated Connect Four. Obviously you could play your own game of Thoughts and Crosses with pencil and paper, and make it even more endless than this, so the main attraction has to be the inclusion of a single-player option, in which the Dragon plays the thoughts once your first cross has been placed in one of the centre squares.

Each move has to touch the edge or corner of a previous move, as in Othello, and while the computer is "thinking" you can press the "H" key to see the best move it has discovered so far. The response is reasonably quick, though

some of the program's priorities seem a little wrong as you still have to wait even when there's only one move the micro can make to prevent you completing five in a row.

Other options include various combinations of screen colours, the chance to look again at the last two moves made, and also an option to take back the last two moves, though the accompanying notes warn you that this could then lead to certain illegal moves being accepted. There's only one skill level, and it does offer a tough game, though I beat it on the third attempt when I began to work out some of the tactics of this 70-Tac-Too.

Not a stunning piece of software, then, but it'll while away an hour or so if you fancy something harder than Naughts and Crosses and easier than Othello.

Mike Gerrard



A real thrill

Program: *Blaze Tower*, Thrillsoft, 40 Tinkins, Killybeggy, Fife KY2 6MT.

THIS IS a BASIC adventure by Thrillsoft, a company new to me, if they learn to program in machine code, one obviously destined for success.

The reason I say this is that this adventure appears to have been well designed, though not implemented to its full potential.

The adventure has you shipwrecked upon an island to which you want to search for your friend, who disappeared under mysterious circumstances...

However, this game has one strange anomaly not found in other adventures for the Dragon in that the player is controlling not only himself as "Joe Average" but also a muscular father, a slightly weaker mother, and a young child, each of which can perform certain tasks that the others cannot.

For example, whilst you may not have enough strength to lift a large rock, the father might, so whilst "GET ROCK" as a command will give a reply

along the lines of "You can't do that" typing GET ROCK (where T is the code for father) will achieve the desired effect, and so on.

The adventure starts fairly innocently but is planned so that just as the adventurer starts to become a bit bored with the dullness of the setting they come across a diary which reads "... no, I won't spoil the surprise — suffice it to say that it is enough to watch the player back into the game with renewed vigour.

I hope that the game I reviewed was a review (pre-production) copy as the cassette cover was dot matrix printed and the game stopped with an I/O error when I died from drinking a poisoned stream (which I suppose I should have EXAMINED first); due to the anti-plagry technique employed, the game was un-installable (without PORING around in the guts) and so, for the average Dragon owner, unnecessary, and thus in need of re-loading — not really very fair!

I would have liked a list of commands, and some more



Program: *Datafall* Microdeal, 41 Turo Road, St Austell, Cornwall PL25 3JG.

Price: £1.99

THIS IS the first of two games that set you up at the bottom

of the screen as a catcher trying to catch the falling objects. The idea is simple and in one case works quite well.

Sadly, this is not the version that works. On my second game I just kept going until I gave up through boredom!

There's really very little to say about a game like this. Movement is proportional and therefore tricky to use, the data that is being is boring and unimaginative, and the game has not got that extra "oomph" to set it above the rest.

Sure, it's well programmed, and has no bugs, but so was "Guess a number between one and one hundred" (the program which everyone wrote on their ZX-81s for those of us who remember that far back) and it played as well as this.

Jason Orbaum



Chaos!

Program: *Caverns of Chaos*, Blatty Software, Dreamways House, Lutterworth Road, Blatty, Leicester.

Price: £3.99

ATTACK of the clone miners... Episode several hundred and eighty six.

This is the first of what looks like being a series of games in the tradition already mentioned enough times. The difference between this and its adversaries *Diagrams* (twice joined by the chip) is that this game is absolutely superb.

It moves with all the beauty of its renowned father figure and is in fact a lot more accurate in its collection details than the Dragon version of its renowned predecessor.

The screens are very well designed and beautifully filled with a very clearly pronounced art (which, of course, appeared to my warped mind immensely). Each has a clearly defined route and although I have only finished the first six

or seven Blatty kindly provided me with the key word which enabled me to start at any screen so I have now seen them all (and I'm not publishing the keyword — unless of course someone out there in the real world can provide what I like to call "the right price").

The graphics are very good, the title than looks suspiciously like *Master Willy* with a space helmet on, and the sound is fine.

You have nine lives (which gives the player a fair chance to get through all 20 screens, allowing for carelessness). Lives are lost by bumping into one of the many objects or falling too far (although this does seem to be a very long way). The man can leap great distances and all the Matthew Smith jumping tricks are thrown in easily on to allow the programmer to come up with one or two of his own.

To sum up then, a very well-designed and executed program which should delight any *Atari* Miner fan.

Jason Orbaum



purple prose to describe the locations, but I can wait for Introscore or Level 9 to recognise the Dragon!

The game has SAVE and LOAD commands, and is a fairly easy adventure, so for

the beginner who likes a challenge you could do a lot worse than get this program — provided they iron out the bugs!

Jason Orbaum



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**Wizard
Software**

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Journal of Management Inquiry 22(1) 3-14

at this point, but students could spend time in the high-mountain regions (see Table 1) as needed, perhaps, as an added challenge to students in the course to collect a variety of mountain birds. Students in the working course are likely to have already done this, but it may not be the case for those representing other groups. Some, high-level, low-temperature and some birds are common in the region.

FIGURE 1

It is essential that you read machine code (where provided) in full, including options. Where you cannot read the labels in the practical tables of the instrument you can: (1) ask the technician to read the labels; (2) ask the technician to read the labels; (3) ask the technician to read the labels.

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Europe	500,000,000	10,000,000
Asia	3,000,000,000	40,000,000
Africa	1,000,000,000	30,000,000
South America	300,000,000	17,000,000
Oceania	30,000,000	3,000,000
Antarctica	0	14,000,000

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Learn Basic

Program: Learn BASIC Programming on the Dragon 32, Logic 3, Spectravideo, 100 South Road, Morden, Surrey SM4 4JH
Price: £14.95

IT'S CLEAR that computer manufacturers are always faced with a problem when it comes to designing their documentation. Buyers will include first-time users as well as experienced programmers, so instruction in programming skills is needed as well as details of the BASIC and hardware features of the machine.

Recent computers, such as the Commodore 16 split the documentation into sections: a guide to the computer, an introduction to programming and an advanced guide (for which you unfortunately have to pay extra). The Dragon is one of those computers that tried to put everything into the manual, and in doing so, failed to provide a clear introduction for new users.

'Learn BASIC Programming' is a series designed to refresh those parts that manuals fail to reach and covers several machines. The Dragon version consists of an A4 size book (as large as Dragon User) containing about 300 pages, as well as two cassettes of sample programs and a flipchart stencil. From the style of the text, it should not be too difficult for most teenagers, although adults should find it amenable.

The chapters start from fairly simple stuff, setting up, using the keyboard, etc, and progress through the usual range of PRINT statements, variables, simple programs, inputs and loops up to chapters on sound and graphics and use of maths functions. This is covered in a fair amount of detail and is quite good at explaining the more difficult features.

It is disappointing to discover that although it has an index, there isn't a chapter breakdown at the beginning, so it is difficult to discover the structure of the book. One reason why there isn't a breakdown may be that the structure of the book is very linear. In other words, there are no alternative routes through the book — you start at the beginning and continue until you reach the end.

This may seem to be very logical, but it's not the only way people use books, as educationalists discovered in America in the 50's and 60's when they tried to introduce teaching machines. It is true that there are many areas of programming which depend on earlier building blocks of knowledge, but the course would have been more useful if the chapters had been more self-contained, to allow a 'dipping-in' approach.

The book has many diagrams which are very useful, as well as many short programs to demonstrate the points being covered. The cassettes contain some of these, as well as several quizzes so you can monitor your progress. One of the programs is full of deliberate errors, so you can practise editing skills as they are covered in the text. The way the cassettes are used to back up the book seems to be a very good idea, although it undoubtedly helps to explain the high price of the package.

According to Logic 3, the philosophy of the package goes back to that of the developers of BASIC in the 60's, and the chief author, Professor Andrew Colin is the founder of the 'Socratic Method' of teaching BASIC. In spite of the high pedigree, it is disappointing to discover that although this book will teach you how to program in BASIC, and is one of the clearest books in this area, it does little to encourage elegant programming.

Many universities no longer consider BASIC a suitable programming language, and ignore it completely. Of course to do this in the world of home

computers, that are without exception BASIC machines, would be stupid. What is important, however, is that the way BASIC is introduced should encourage an approach to computing that allows users to easily transfer to other programming languages. If BASIC is considered as a tool to help solve problems, then finding the solution and writing out the program flow is just as important as actual coding.

This package does encourage the use of flow charts, which soon show up weak ideas, and does include a flow-chart stencil. Some of the programming examples, however, are themselves very poor examples of good structure, and one 20 line program has no less than 7 GOTO's. There is no mention of pro-

gram modules, using sub-routines to perform particular tasks and making it easy to understand the flow of the program. I understand that these features are covered in the follow-up package, 'Advanced Programming on the Dragon'. It is a shame that these points could not have been introduced in this book, as they lie at the heart of good programming.

To sum up, 'Learn BASIC Programming on the Dragon' is a nicely presented package that does a good job of filling in the gaps in the manual for the person learning programming. Although I would disagree with the way some of the ideas are introduced, the text is very clear and would certainly help you if you need more about your Dragon.

John Dorian



Bull!

Program: Toppler, Microdeal, 411 Thoro Road, St Austen, Cornwall PL26 5JF
Price: £1.99

A PSW arcade in the country still possesses original working machines with the game on them. It involves, quite simply, shooting at plastic ducks, ruddy rabbits, etc in a simulation of a fairground or carnival shooting stall. You know, the sort where the sights are always fixed?

The game never caught on in the arcades and is unlikely to catch on here as it is too simple. After the first fifty games it sounds like a lot but isn't when you think about it's it is easy to get through the first screen perfectly and all that awaits you is a series of similar screens.

An attempt to build the interest in the game is the inclusion of a 'bonus Game With Tummy Tonic' (Tummy tonic???). This is pointless, contains very little skill and is phenomenally boring to play if a writer intends to include a bonus game, they should at least have the sense to make it good fun!

The game also has a bug. Although the bullet count starts at 45 the last bullet is only allowed to travel one line up the screen before the game ends (surely it would not have taken a major program restructuring to decrement the



count when the bullet leaves the screen or impacts with an object?)

The game, for all its snide comments, is still a good game and well written, but my dinky mind couldn't help but wish that the programmer's name was Andrew as it would have added a certain something to the title screen. Still, I suppose I'll just have to go on taking the pills.

The game incorporates the now famous Black, Green, or Bull (dirt) colour selection but, as usual, texts best in black.

If you liked it in the arcades you won't be disappointed with this version, even if the proportional movement is initially difficult to handle. Me, I'd be pressed to say I liked getting ducks.



Jason Osborne



Olympia

Programs: Olympia, Blaby Software, Crossway House, Lutonworth Road, Blaby, Leicestershire
Price: £3.95

There IS a version of a game that has now become an arcade classic — Hyper Olympia. However, it has a lot of faults and very few redeeming features.

Let us start with the faults. First, the arcade game involved using either one button very quickly (by the muscle tension and spasm method) or two buttons (by the planter's method). The Blaby version uses the space bar to run, and only the space bar. This means that those who were used to co-ordinating two hands will have to start all over again.

Secondly, the game does not feature all six events, choosing instead to omit the javelin throw (presumably because the programmer assumed lately that it is unpopular, featuring such a close similarity to the long jump).

Thirdly, the events are nar-

rowed. The arcade events were 100 Metres, Long Jump, Javelin, 110 Metres Hurdles, Discus, High Jump. The event order in Blaby's attempt is 100 Metres, Discus, Long Jump, 110 Metres Hurdles, High Jump. This is a small fault, which some may even consider an improvement but, in an arcade copy, as few changes as possible should be made.

Next, the game does not incorporate a sideways screen scroll (although it would not have been difficult to write) which means that the proportional speed in comparison to player height on screen is laughable.

The angle increases far too quickly, leaving very little to judgement, and far more to luck. This is a very serious fault, more serious as it is easily rectifiable.

There are only five hurdles, and they are too precise in their jumping requirements. Although I have progressed through this event I have yet to complete it without knocking over one or more hurdles.

There is no resemblance to the arcade in the high jump! You run to the bar (by pressing the spacebar as fast as possible) and then pressing

shift, I have not succeeded in doing this yet so I have no idea what the compensation display is like.

The game's major virtue is that it has the addictive quality of the original, it is a slightly diluted form. The events are,

for all their numerous and irritating faults, good fun, and they have a temporarily addictive quality that wears off only after a large number of games.

Jason Osborne



Fingers!

Program: Fingers, Blaby Software, Crossway House, Lutonworth Road, Blaby, Leicestershire

Price: £5.95
FIRSTLY, may I congratulate Blaby on a fast and efficient mail order service. When the original version of this refused to load I was sent another by first-class post on the day I rang up. This is the sort of service that will keep the Dragon alive, and is rather different to that offered by certain other big Dragon software companies.

So, to the game. Well, guess what? It's a filler! Can't! This time the character has no name at all — he is supposed to represent the player himself. And the aim? To open sales by collecting all the keys on each screen.

The graphics are actually in

colour (shock horror!) and look very good.

The layouts are well designed, the graphics clear, and there is an option to start in any of the 13 screens.

The usual platforms, collapsing walkways, and conveyor belts are there, but this game has an interesting extra control, although played by joystick (no keyboard option ... grr). The space bar reverses the direction of all the conveyor belts. This has allowed the programmer to design some new tricks into the screens.

On the whole a very competent and well controlled.

Not as good as Clonus of Chaos and it seems to have a very small number of screens, but for £5.95 who cares? Well above average, and it's nice to avoid stupid monsters in colour.

Jason Osborne



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Popular Computing Monthly, Dec. 1981





THE MICROTRAIL column is going to be exceedingly educational, dealing later with moments of historical importance in the development of the adventure game, but first with some news on Microdeal's *Spyguy*. No, not that someone's solved it, but the derivation of the title. It hadn't occurred to me for one minute that it might be a real word, but in looking something up in the dictionary the other day I came across it, and in fact it has six different definitions in the various fields of mathematics, biology, astronomy, etc. In biology, for example, it means the inevitable union of two joints of a ciliated. Not many people know that, but even Microdeal's Managing Director John Spence, who I saw at the PCW Show in September. What he did know, though, was that Microdeal are still firmly behind the Dragon and have further adventures aimed ready for release. Interestingly enough, one is to be released by them on two machines only: the Dragon and the IBM PC! Watch this space.

From as yet unleased titles to the depths of adventure history, those pre-war days of the 1970s when two Americans named Crowther and Woods wrote the first ever computer adventure, most commonly known nowadays as *Colossal Cave Adventure*. This first game has remained one of the best, but till recently was not available to Dragon owners. Now Compuseries has released a version on disk only, operating under the CP/M-DOS system, so at least a few Dragon adventures out there will now have access to this classic adventure at the very reasonable price of £29.95. Not being dissuaded by a CP/M-DOS system myself, I asked regular reader Nick Sutton from Rainford in Merseyside to review the game for me, and this is what Nick thought of it.

"Once this text-only adventure is loaded, you find yourself at the end of a road, next to a brick building, with a gully running close by. Nearby is a cave complex said by many to contain a fortune in treasure. Your brief is to collect as much treasure as possible from the cave and return it to the safety of the building. You're told that although many have entered the caves, few have returned. Very cautioning.

"The adventure accepts the usual variant-room input and the range of commands available is fairly standard and quite large,

except for a rather odd GET command which sometimes will GET objects a long way away from your present location. I found this very strange, but it does have its uses once you know what you are looking for. Also useful is the ability to move long distances by typing one word, usually a magic one discovered from somewhere in the adventure, although if you type BUILDING when you're above ground then this will usually take you there.

"If the thought of playing this lengthy adventure with the Dragon standard text display sends dread through you, then fear not. The text has been defined into small, neat black-on-white text with true upper and lower case. All inputs and descriptions are sent up the screen, which can make it look a little confused but this is not a major problem. Taking of problems, the first one you might encounter is how to get into the caves, but this shouldn't present too many difficulties for readers of this page, just don't forget your keys. Once inside you encounter a snake that's none too keen on letting you pass, though you should have found something on the way in to deal with this, if you can get it right, and as for the other violent dangers you should try fighting fire with fire. Other equally charming characters you will meet include a pirate who steals your treasure, a troll and a dragon. Problems range from easy to not-so-easy.

"The descriptive text can only be described as first class, and the location in particular, the volcano, takes two full screens to describe! I would recommend making regular use of the SAVE command (save to disk), as often you do the resurrection routine tends to be a little unreliable after the second time. Typing HELP gives you two screens of general information, although specific help is sometimes available provided you're prepared to sacrifice some of your score.

"The adventure is one I would recommend to anybody with the hardware to run it, is good value, and compares well with other adventures I have played. Definitely one for the collection, and good work from Compuseries in bringing it out."

And good work from Nick for that review, he also offers to help any readers transfer their tape-based software to disk, and has done this himself for *Mithras* and the *Minecart*, *Escape from Pultar 7*, *Mission of Doom*, *Sea Quest*, *El Dabiano* and

Black Sanctuary. Send me for details to Nick Sutton, 44 Holly Crescent, Rainford, St Helens, Merseyside WA11 8BT.

Nick's in good company in liking the *Colossal Cave Adventure*, as someone who played the game enthusiastically in its mainframe days was Scott Adams, now a well-known adventure writer. He liked the game so much he wrote his own adventure, which he called *Adventureland*, and this became the first of a lengthy series from the company. Scott Adams set up *Adventure International*. Till now Dragon users have only had access to the more recent *Questprobe* series, *The Hulk and Spiderman*, but at last at last one of the early Scott Adams games have been Dragonised. This month, however, there's only room to look at the first, *Adventureland*.

The screen layout will be familiar to those who've done battle with *The Hob* (the giant green text screen) and it's a shame the text hasn't been redrafted in the Mysterious Adventures style. Not that good atmospheric text is the reason for buying a Scott Adams game, as he tends to be brief in the scenes, the challenge coming from the fiendish nature of the puzzles he sets.

In *Adventureland* your aim is simply to locate 12 valuable treasures, and the early locations include the traditional forest, meadows, lakes and caverns. There's a quicksand bog which you can only escape by dropping everything you're carrying... so how do you get at the treasure that's in there? And how do you deal with the nasty Chiggers that sink their teeth into you in the swamp? And what about the dragon sleeping in the meadow?

Before too long you should have used the familiar adventurer's axe to gain access to a large underground cavern, and then you can start exploring the tunnels and chambers... and the dreaded maze of pits. The presentation of the game leaves a little to be desired, with the screen being very cluttered and flashing constantly as text is rewritten and updated, but the adventure itself is intriguing and I fully expect to be trying to deal with questions on this and other Scott Adams adventures in future columns. The cost of each is £29.95, though at the time of writing *Adventure International* is still making their last-for-the-price-of-one summer offer, so check out their ads if you can.

Two readers this month have written to suggest an adventure-tape section, and also ask about the legality of swapping software. I don't think there would be any problem in readers swapping original adventures on an informal basis, but no one should attempt to swap duplicated or pirate versions of tapes. We won't set up a separate section yet, but to set the ball rolling there's Brian Bask of 21 Westcott Road, Swindon, Wiltshire, who has finished with his copies of *Sea Quest*, *King of Darkness* and *Madness and the Minotaur*, and is looking for *Mansion of Doom*, *Shenagans*, and the graphics version of *Galileo Island*.

Brian should have no trouble swapping his copy of *Madness and the Minotaur*, as I can guarantee getting at least one letter each month from a reader asking where he or she can get hold of a copy. This month's request is from Damian Hogg, 6 Toland Square, Rom Hampton Lane, London SW15 5PA. Damian offers help in exchange for use on *Galileo Island*, *Time Machine*, *Franklin's Tomb* and *Ultimate Adventure*, and needs to know how to keep the *Big Gem* from being eaten by ants, and what is the use of the mirror in *The Hulk*. We also ask why *Colossal Cave* isn't available on tape for the Dragon, and suggests I set about the task of adapting it! Well, Damian, I'm sure if it could be done easily then either Level 9 or Compuserve would have produced a version on tape, though if anyone wants to try doing it then the adventure storyline is not protected by copyright and is available for anyone to



adapt or publish. (That doesn't mean Compuserve's disk version is not covered

by copyright, incidentally.)

A copy from Stephen McConnell "and his dad", of Rose Cottage, Belsay, Newcastle upon Tyne, who have been battling with *Shenagans* since Christmas and want to know how to deal with the snake and what use the young woman is who's lying in a field. As often happens, the two are connected, and if you can get the woman to move then you might find something to help you shift the snake.

Finally some hints on *Mansion of Doom* from reader C. Vaughan of Cardiff. The hints are printed backwards, in case some readers would rather not see them. Firstly, ELON ACEN T088 NTON ODUON. CTE DCBA 8ENH GYRA NORT CDEHT; ISAC NENQ HTWA 8000 ONAM 8HTH CTAC; EKAN DYNE 8000 NOMP CHD.

Month next you see . . . sorry, can't get out of the habit. See you next month.

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpings — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help.

Adventure
Problem

Name
Address

Box 13/13 Little Newport Street, London WC2E 9PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trail to write to as well.

Nov 88

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If you've got a technical question write to Brian Cudge.
Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

The blues?

I OWN a Dragon 64 computer and have noticed that when in the BASIC mode the cursor changes to a blue colour. As the Basic is in RAM is it possible to change the colour of the cursor by POKEing somewhere?

Phil Jackson
Solihull
West Midlands

IT IS possible to change the colour of the cursor in 64 mode however, as you say, the Basic is stored in RAM, and so can be changed by POKEing. The two locations that need to be changed are \$4194, which holds the graphics character for the cursor, and \$4196, which is equal to the graphics character less 143. The following table gives the values to be poked for the various colours:

Colour	\$4194	\$4196
Yellow	159	16
Red	161	48
White	207	64
Green	223	80
Purple	226	96
Brown	230	112

Floating point

COULD you please clarify the method of dealing with real numbers and integers with respect to machine code. I am having difficulty understanding how to deal with the ROM routines INTCAL (address \$582C0), GINAME (\$6027) and MORPM (\$635F).

When passing a numeric Basic variable to assembly routine via a JSR call I always end up with an integer result no matter what is passed.

M Johnson
40 Great South
Road, South

TO ACCESS the value passed in a JSR function in its full floating point form does not require the use of any ROM routines. The Floating Point Accumulator will hold the value at entry to your routine. This is stored between locations 79 to 84.

Similarly, the value returned by the JSR function will be in the Floating point value stored in this accumulator. The various ROM routines often used simply convert 16-bit numbers to and from floating point form.



Ram to?

I HAVE recently bought a Dragon disk drive, but have come across a problem. My problem is associated with programs such as *The King and Dave Fighter*. I can save both of these to disk, and load them back in, but they will not run correctly when executed, presumably because of DOS using RAM at 1508 — 2071. Is there a way of returning this RAM to the program before the game is EXECuted?

Mike Holmes
8 Monks Head
Marinefield
Cheshire

PROGRAMS that require the BIOS memory but which do not actually run into that area can usually be run by adding the following command before the EXEC command — POKE 348,255. This stops DragonDOS from altering page 3 memory during the BIOS routines. As this will also have the effect of not stopping the first major if it is as you should also add POKE \$5F44,0 to stop the disk immediately.

Battlezone

I HAVE had my Dragon for nearly a year and over that time I have bought a wide selection of games for it. But so far I have not found a game that is like *Battlezone*. Could you please tell me if there is such a game for the Dragon and if so where I could get it from and how much.

Nicholas Russell

THE MOST accurate copy of a *Battlezone* game that I have seen for the Dragon is *Battlezone Revenge* from Design Design Software. This uses Hibernex ROM \$680-4 graphics for the wire-

frame effect with the option of keyboard or joystick control. Prices vary, but you should be able to get a copy for about £7 from one of the mail-order advertisers in Dragon Unity, or you can contact Design Design at 3 Ashdon Way, East Herrington, Sunderland.

'Allo, 'allo synthesis

I WOULD like to know if you could tell me of any speech synthesizer that slots into the MOS6502 interface on the Dragon 64. I would prefer it to be the Alphaphone type, but I would consider any others. I am looking in the price range of about £40. Also could you advise me on a way of adding an external speaker with or without breaking into the machine.

Alan Wilson
36 Spencer Lane
Southminster
Leicestershire LE16 6AR

THERE ARE a number of speech synthesizers available for the Dragon computers. One of the latest synthesizers I have seen is from J. Morrison Ltd, better known for their software. Their 'Synthesizer' unit uses the alphaphone technique for creating words and costs £25. Also compatible with the Dragon is the new Speech-Sound ROM-PAK from Tandy. This is a more sophisticated package, which includes 2K of RAM to store routines in. It costs £80 and is available from Tandy stores.

You cannot connect an external speaker to the Dragon directly, as all sound outputs need amplification. The best place to get a sound signal from is the speaker socket.

A real character

I WOULD be grateful if you could show me how to redefine the entire character set, as I have tried many times without success. I would appreciate it if you could also show me how to alter the colour of the character set, as I am sure this would be an asset when writing adventures or word processor programs. I would also like to know if the new character set will be compatible with the printer. How many colours would be available with the new character set, and how much memory would this routine take up?

Leslie Jones
158 Kenton Road
Pen-y-Mans
Huyton
Cheshire

UNLIKE some other computers, it is not possible to redefine the Dragon's character set as it is held on an internal ROM as part of the graphics chip, nor is it possible to change the colour of the characters (apart from SCREEN 0,1).

There is no shortage of programs available which will display text on the hi-res screen, and allow you to change its colour and redefine the characters. One of the best such programs is *Alpha Magic* from Knight Software.

Light fantastic

I HAVE recently received a Lightpen (the Delapan advertised in your magazine) and would like to know how to convert an (x, y) co-ordinate in Mode 4, 1 byte size (256 x 100) into a Print (x) position on the text screen.

Barry Caruth
132 Corporation Road
Co Down
Northern Ireland
BT20 4NP

IT IS relatively simple to convert MODE 4 co-ordinates to a PRINT(x) position. The following Basic section shows how, assuming X and Y to contain the hi-res co-ordinates. P will contain the print co-ordinates.
100 P=INT (X/64 + 12*INT (Y/12):PRINT P:—

Firmware

Brian Cudge explores the Dragon's ROM in a special series which builds up month by month into a firmware manual.

THIS MONTH it is the turn of the *Test Input and Output* section of the Dragon's ROM. The routines in the 'Test Manager' deal with reading the keyboard, and writing characters to the screen and printer.

Text Manager Memory Map

The following locations are associated with the Text Manager. Many of them can be used by the Basic programmer, notably those which control the set up of the printer.

52/54	Address of Keyboard Input Buffer.
126	VDU Comma Field Width. This is the number of spaces between items printed with a comma — 16 by default.
127	VDU Last Comma Field. This should be equal to the width of the screen less the value in 126.
130	VDU Current Column number. Can take a value from 0 to 31, and is the same as returned by POSX in Basic.
182	VDU Line Width — the number of characters per line.
111	DEVN — this is an important location called 'Device Number'. It determines to which device text output goes and input comes from. It takes the following values — 0=VDU, 155=TAPE, 254=PRINTER. For a printed directory listing try POKE 111,254 (D.H.).
135	ASCII Code of last key pressed. Remains intact until the next key is pressed — ie it is not reset when the key is released.
128/127	Current VDU cursor address. The memory address of the current screen print position. Takes the values 1824 to 1835.
143	Cursor Flash Counter. A location used to count down to zero to control the rate at which the cursor blinks.
151/152	Keyboard scan delay constant. This delay is used to try to prevent 'bounce' on the keyboard.
153	Printer Comma Field Width. The number of spaces between items printed with a comma — default is 16.
154	Printer Last Comma Field. Should be equal to the width of the printer less the value in 153.
155	Printer Line Width — set this to the width of your printer, eg 80 columns.
156	Printer Head Column. The same value as returned by the POSX-03 function in Basic. This will only operate correctly if locations 153-155 are set up.
329	Printer auto LF/CR flag. A non-zero value will cause the end-of-line sequence to be output after

329	a line has been printed. Location 155 must be correctly set up.
338	Carriage Look Flag. A non-zero value causes Uppercase. Number of characters in the End-of-Line sequence — range 1 to 4.
331-334	End-of-Line characters. By default these are set up as CR/LF, NULL/NULL. The end-of-line sequence is output when a CR is sent to the Printer output routine.
336/345	Keyboard 'Roll Over' table. Used when scanning the keyboard and to check if same key has been released.
1821/22	End-of-line delay for RS232 port on Dragon 84.
1823	Dragon 84 Printer select flag — 0=Centronics port, non-zero=RS232 port.
4828/7	Dragon 64 RS232 port baud rate controller port.

The following locations are different for the Tandy 1000:

- 149/150 Serial printer baud rate constant.
- 151/152 Printer End-of-Line delay constant.
- 262 Carriage Look Flag — Non-zero causes Uppercase.
- 328-345 Keyboard 'Roll Over' table.

Test Manager Firmware Routines

Scan KBD	Dragon 44/91 (Tandy 41400)
Scans the keyboard for a character. If no character is available then a 2640 is returned in the A register and the Z condition code is set (SCC), otherwise the ASCII code of the character is returned in the A register. Shift-0, the caps lock key, is dealt with internally and will return a zero.	
Wait Key	Dragon 34081 (Tandy 44539)
Calls the 'Scan KBD' routine until a key is pressed. The ASCII code is returned in the A register. The break key is also checked for, and if pressed the 'STOP' routine is executed.	
Wait with Cursor	Dragon 41194 (Tandy 39338)
Calls the 'Scan KBD' routine until a key is pressed. The flashing cursor is displayed at the current print position whilst waiting for a key. A space is printed over the cursor when a key is pressed to remove it from the screen. The ASCII code of the key is returned in the A register.	
Update Cursor	Dragon 48553 (Tandy 41369)
Decrements the cursor flash count location, and if zero resets it to 50 and flashes the cursor.	
Clear Screen	Dragon 47735 (Tandy 43284)
Clears the screen to spaces and resets the cursor position to the top left of the screen.	
Clear Sen to Cr	Dragon 47737 (Tandy 43288)
Clears the screen to the character in the G register and resets the cursor position.	

Clear VDU Line	Dragon 48288 (Tandy 41763)
Clears the current VDU line from the current cursor column to the end of line and sets the cursor position to the start of the next line.	
OUTCHAR	Dragon 46418 (Tandy 41823)
Outputs the character in the A register to the device number in DEVN (see 111). Any special action for CR is also handled by this routine. This is the central character output routine for all devices.	
Out String	Dragon 37083 (Tandy 47916)
Outputs a text string to the device number in DEVN. On entry the X register points to the byte before the first character in the string. The string is terminated by a zero byte.	
Print CR/LF	Dragon 37095 (Tandy 47918)
Moves the cursor position down to the start of the next line, printing the screen if necessary. This routine is a quick method of sending a CHR\$(13) to the OUTCHAR routine.	
Print Number	Dragon 38286 (Tandy 48586)
Outputs the 16 bit number in the D register to the device number in DEVN. The number printed is between 0 and 65535, unsigned, with no leading or trailing spaces.	
Reset VDU	Dragon 43223 (Tandy 38316)
Resets the default VDU screen mode and offset to start at address 1824.	
VDUReset	Dragon 46295 (Tandy 41738)
Prints the character in the A register to the VDU, but does not reset the screen mode and position. This can be used to print characters on an orange background for example.	
PRINTERout	Dragon 48410 (Tandy 41653)
Sends the character in the A register to the printer. This routine waits for the printer to become ready if it is busy. In the Dragon 84 ROM, the routine also waits if any key is held down.	
PRNLF	Dragon 48294
Moves the printer head to the start of the next line. The End-of-Line character sequence is set to the printer to achieve this.	
PRINTEDout	Dragon 48373
The character in the A register is sent to the printer directly. No interrupt of the CR character takes place. This routine is not necessary, and indeed does not exist in the Tandy ROM.	

Next month, the Graphics Firmware and Memory Map.

This is the third part of Brian Gadder's series on the Dragon's ROM routines. If you have missed the previous issues, they can be obtained for £1.25 each including postage and packing from our editorial offices.

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Competition Corner

Answers to Competition Corner,
Dragon User, 12-13 Little Newport
Street, London WC2E 8PP.

IN THE February 1985 issue of *Dragon* User we looked at triangular, tetrahedral, and pyramidal numbers with little reference to the order of numbers known as perfect squares. As these 'perfect' squares occur with some regularity in mathematical puzzles their examination may prove useful. In the world of these puzzles reference to square numbers almost exclusively refers to integral squares — that is numbers in the series 1, 4, 9, 16, 25, ... and so on. In everyday life perfect squares occasionally occur — the 3 by 3 grid of the noughts and crosses game, the 8 by 8 grid of the chessboard, or the 19 by 19 grid of the colonial game of 'Go'. In mathematical puzzles they tend to occur with even greater frequency.

Consider the following. Henry had been saving pennies. By laying them out on the floor he was able to arrange them in rows with as many coins to each row as there were rows in all. Henry also had fifteen peggys-banks in which he kept the coins. When he had filled the peggy-banks, each with the same number of coins, he had just two coins left over. What was this smallest amount that he could have had?

Reducing the problem to its mathematical 'bones' we are required to find the smallest square number which leaves a remainder of two when divided by thirteen. So we might devise the following program:

```
10 S=1
20 T=0
30 D=INT(T/13) R=T-D*13
40 IF R=2 THEN PRINT T:END
50 S=S+1:T=S*13
```

In this program, S equals the number of coins in each row, T, the total number of coins present, D, the numbers of coins in each of the peggy-banks, and R, the remainder after the division. Line 40 ensures that the first time that R equals 2 the program stops.

If we want to type in the program and RUN it we would wait a little while for the expected result. After a time, when nothing had happened, we might suppose that the program contained a bug, or, alternatively, that either our typing in of the program or our mathematical interpretation of the problem was faulty.

In fact, the problem is incapable of solution. And the line: 30 PRINT R and



DRAGON 22/84
BANDY COLOR 22/84

never run it. Note how R, the remainder, is always either 0, 1, 3, 4, 6, or 12, and never 2, 5, 6, 7, 8, or 11. This general property applies to any prime divisor, and once the remainders have been worked out for any given prime, the set of number obtained will apply to all possible squares when divided by that prime. For example, dividing any square by 3 will always give a remainder of 0 or 1, and never 2. Dividing by 5 will give a remainder of 0, 1 or 4, and never 2 or 3; dividing by 7 gives a remainder of 0, 1, 2, or 4 but never 3, 5, or 6. Such an insight can prevent much wasted time when interpreting a problem into mathematical terms.

Other 'rules of thumb' can also be useful. As the units digit of a perfect square can only be either 0, 1, 4, 5, 6, or 9, we can say at once that any number ending in 2, 3, 7, or 8, cannot be square. Similarly, the Digital Root of a square can only equal 1, 4, 7, or 9, so any number with a DR of 2, 3, 5, 6, or 8 can also be deemed to be non-square without the necessity of actually working it out. Note that these checks can only be used as a negative test — it is to say that a certain number is not a

perfect square. It is not correct to assume that a number which passes these tests is square, only that it may be.

There are a number of other interesting properties of squares which can sometimes assist in problem solving. Every odd number greater than 1 can be expressed in at least one way as the difference of two squares. Similarly, every multiple of 4 greater than 4 can also be so expressed. There are an infinite number of perfect squares which are the sum of two smaller squares. For instance $2^2 + 4^2 = 20^2$, or $6^2 + 8^2 = 10^2 = 10^2$. This is, of course, the Pythagorean relationship, though here limited to integral solutions. Automorphic numbers are a particular type of number whose squares have as their last digits that number itself. Simpler examples include the squares of 5 (25), 6 (36), 25 (625), and 405 (164025).

Interesting from a numerical point of view are such squares as 139654276 and 66284744, which contain the nine unreplicated digits, and 1026763849 and 9814072958 which contain all ten. In total there are 60 squares which contain all nine digits unreplicated, and 67 which contain all ten.

This month's competition is based on an old mathematical chestnut that was popular some years ago. 'Mrs Smith has an egg tray the size of a small table top, divided into square compartments, with as many compartments to the row as there are rows. She has just enough brown and white eggs to exactly fill the tray. Moreover, she finds that she can arrange the brown eggs to fill a perfect square in the centre of the tray, with a uniform margin of white eggs around the outside. Alas, however, if she puts the white eggs in the centre, she finds that the square is one size larger than before, but she can only do this by first putting one brown egg in the exact centre compartment. Again, the brown eggs remaining form a uniform border. How many eggs of each colour has she?

Unfortunately, there is more than one answer: the problem as stated does not give the exact size of the table, nor does it mention the type of eggs involved. In view of this can you find the three smallest possible answers?

Get Ready

They are Douglas Mynors of Gillingham, D Stanley of Southampton, Rachel Hart of Knaresborough, D Child of Brix, Luis Martinez of San Sebastian, Spain, Marilyn Preston of Kington, D Chambers of South Shields, W Coulson of Wellingham, Chris Gill of Weymouth, James Beale of Folkestone, G Chamberlain of Hildesheim, Peter Hacken of Gillingham, Derek Probyn of Chatterton, Miss Collyer of Haslingfield, D Richardson of Heston, P Whelan of Stevenage, Simon Aspinall of Seaton, Gavin Skelton of Ramsgate, Ian, Isabel, Judith Hill of Chaffham and Tanya Loomer of Chaffham.

Prize

THE PRIZE this month is from Design Design — 25 copies of *Dark Star* can be sent by readers clever enough to solve Gordon's latest conundrum.

Rules

SO write a copy of Design Design, you must first show the answer to the above problem, and, secondly, demonstrate how you solved it with the use of a BASIC program written on your Dragon.

Please do not send in a cassette containing your answer.

Make sure your name and address is printed clearly on your entry and mark

the envelope November competition. Envelopes which do not say which month you are entering for will be disqualified.

As a tie-breaker, complete the following sentence in 10 words or less: "I want to visit a Dark Star because..."

Entries must reach *Dragon* User by the last working day in November. The winners will be announced in the February 1986 issue. The editor's decision is final and no correspondence will be entered into.

August Winners

TWENTY readers have won themselves copies of Software Project's Jet

St. George now has two choices!

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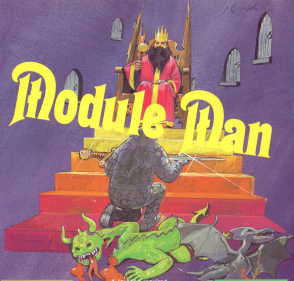


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